

REMARKS

Claims 1 to 22 are in this case. Claims 12 to 17 stand withdrawn from consideration as being directed to a non-elected invention.

The drawings were objected to because Figs. 1a-1c, 2, 3 and 4 should be designated by a legend such as "Prior Art" and corrected drawings labeled "Replacement Sheet" were required. The drawings were amended to obviate this ground of rejection. To clarify the record, Form PTOL-26 indicates that the drawings are objected to; however this is obviously a mistake since it is explicitly stated at page 3 of the Office Action that the corrected drawings received in reply to the (previous) Office Action are accepted.

It is noted with appreciation that the previous rejection of Claims 1 and 3-11 under 35 U.S.C. 112 has been withdrawn.

The claims have been amended to obviate the basis for rejection of the claims under 35 U.S.C. 112 and to more narrowly define and delineate the invention. The claims as amended now require that the claims be limited to the specified materials and those that do not materially affect the basic and novel characteristics of the claimed invention. The specification and claims clearly indicate what the basic and novel characteristics of the invention are, namely the provision of a non-leaching adhesive system which, when in contact with liquid or liquid film present in an application in which the cured adhesive system is used, does not leach compounds that are detrimental to the application.

Claims 2 to 8 now stand rejected under 35 U.S.C. 112 for the reasons set forth at pages 3 and 4 of the Office Action. The claims as amended are no longer subject to these grounds of rejection. The claims are addressed to those of ordinary skill in the art who will

be fully appraised of the invention as presently set forth in the claims when read in the light of the specification.

Claims 1, 5-11 and 18-19 stand rejected under 35 U.S.C.102 (e) as anticipated by, or in the alternative, under 35 U.S.C. 103 (a), as obvious in view of Kitsunai et al, US Patent 6,627,287, filed April 25, 2001.

Claims 1, 2 and 6 to 11 stand rejected under 35 U.S.C. 102 (b) as anticipated by, or in the alternative, under 35 U.S.C. 103 (a), as obvious in view of by Ha et al, US Patent 6,180,200.

Claims 1 and 5 to 11 stand rejected under 35 U.S.C. 102 (b) as anticipated by, or in the alternative, under 35 U.S.C. 103 (a), as obvious in view of Tokuda et al, US Patent 6,017,603.

Claims 1,2,4 and 6 to 11 stand rejected under 35 U.S.C. 102 (b) as anticipated by, or in the alternative, under 35 U.S.C. 103 (a), as obvious in view of Iida, US Patent 6,171,675.

Claims 1, 3 and 6 to 9 stand rejected under 35 U.S.C. 102 (b) as anticipated by, or in the alternative, under 35 U.S.C. 103 (a), as unpatentable over Takahashi et al, US Patent 5,366,812.

Reconsideration of the claims as amended and withdrawal of the grounds for rejection is requested.

Kitsunai et al, US 6,627,287, is directed to improving the normally insufficient adhesion of UV-curable adhesive compositions to substrates having a reflecting layer of a silicon compound through the use of about 0.1 to 5 parts of a silane coupling agent containing an epoxy silane or a (meth)acrylsilane. Patentee discloses a wide range of (meth)acrylates all of which are disclosed to be unsuitable for the production of DVD discs in the absence of a silane coupling agent. In Example 1, a composition is prepared from a mixture of a bisphenol A type epoxy acrylate,

urethane acrylate, tripropylene glycol diacrylate, 2-hydroxy-3-phenoxypropyl acrylate, ethylcarbitol acrylate, ethylene oxide-modified trimethylolpropane triacrylate, ethylene oxide-modified phosphoric acid methacrylate, various photoinitiators, and a silane coupling agent. Example 2 is the same except that a different silane coupling agent is used. (Contrary to the Examiner's assertion, composition (2) of Claim 18 of this application is not disclosed in Example 2 nor is the monomer recited in claim 5. The reference discloses as one of many components, "a bisphenol A type epoxy acrylate". The monomer of claim 5 is not the chemical name of "a bisphenol A type epoxy acrylate" since there are several compounds that meet this description and the reference does not specifically disclose the monomer of claim 5 as asserted). In addition, Comparative examples were prepared in the reference with the same mixture of reference Example 1 but eliminating the silane coupling agent or using an aminopropyltriethoxysilane as the coupling agent. Attention is directed to Table 1 where the durability, appearance and adhesive properties of the composition of Example 1 and the comparative examples are given. The adhesives derived from patentee's polymerizable compositions are disclosed to totally fail in durability, appearance and adhesion unless a silane coupling agent is also present. Compare these results to Applicant's Examples 1, 2 and 3 where excellent results were maintained through the stamping procedure with or without a coupling agent and in addition the resulting adhesives are non-leaching. Non-leaching adhesives are not disclosed or suggested by Kitsunai et al.

Ha et al, US 6,180,200, relates to hybrid free radical-cationic pressure-sensitive adhesives, and cationic adhesive compositions that optionally include free radical cure components

for bonding DVD components including a composition comprising 0% to 70% by weight of an acrylate oligomer, a free radical initiator, up to 99 % of an epoxy resin, a diol including polyether polyols and polycarbonate diols, and a cationic initiator. Additional components such as thiols, and silanes may also be included in the compositions. Cationic cured adhesives are disclosed to be desirable in direct contrast to the instant specification which teaches that cationic adhesive systems are conventionally considered to leach when cured and thus are not within the scope of the instant claims. (See comparative example 1 of the instant specification). In addition, non-leaching adhesives as claimed herein are not disclosed.

Tokuda et al, US 6,017,603, discloses numerous UV-curable adhesive compositions including a radiation curable adhesive composition having the essential ingredients (A) a bisphenol type epoxy(meth)acrylate, (B) a urethane (meth)acrylate, (C) a (meth)acrylate monomer other than (A) or (B) and a photopolymerization initiator. It is asserted that Tokuda et al teach compositions comprising the compound recited in claim 5. Applicants have read and re-read the patent but do not find this material specifically disclosed. (Contrary to the Examiner's assertion, the monomer recited in claim 5 is not specifically disclosed. The reference discloses as one of many components, a bisphenol A type epoxy (meth)acrylate. The monomer of claim 5 is not the chemical name of a generic disclosure of a bisphenol epoxy type di(meth)acrylate as asserted.) In addition, non-leaching adhesives as claimed herein are not disclosed.

Iida, US 6,171,675, discloses adhesive compositions including such compositions comprising (a) a polymerizable (meth)acrylate compound having a phosphate group, (b) a thiol compound, (c) a

polymerizable compound having a double bond and no phosphate group, and (d) a photopolymerizable initiator. Non-leaching adhesives as claimed herein are not disclosed.

Takahashi et al, US5,366,812, discloses compositions which comprise a high-molecular weight thermoplastic saturated norbornene polymer having a molecular weight up to 2,000,000 and suitable for use as optical recording medium. These compositions are disclosed to be sheet-like or film-like articles useful as the substrate in the production of optical recording articles. No disclosure of adhesive compositions comprising norbornene monomers is present in this reference nor would the same be expected by one of ordinary skill in the art. Clearly non-leaching adhesives are not disclosed.

The references fail as anticipatory references and fail to render the invention obvious because among other reasons, they are devoid of any disclosure of curable, adhesive systems that are non-leaching. The Examiner states that there is an absence of comparative evidence that the references discussed above do not provide non-leaching adhesives. The comparative example is deemed to be inconclusive since it comprises an epoxy-amine that is not considered by the Examiner to be representative of the cited art. However, this overlooks or ignores other portions of the disclosure, sworn to by the Inventor as being true, and particularly the following passages of the specification quoted below with emphasis on the underlined and highlighted portions:

The present invention relates to a non-leaching adhesive system. As further defined in the specification at pages 1-2, lines 1 to 15,

" the term 'non-leaching' as used herein refers to the absence of the leaching of compounds that are detrimental to the application in which the adhesive is used. Examples of such applications are the use in deep-UV mastering of high-density

optical discs, the use in deep-UV lithography of silicon wafers, the use in liquid immersion lithography and in immersion microscopy in the biological field. Further important applications are in the assembly of catheters and other biomedical devices for applications likely to come into contact with fluids and tissue as well as in the construction of biosensors, notably those which contain assembled microfluidic structures. Also many applications are found in the veterinary and food & beverage industry. It is in such applications of the utmost importance that the liquid which comes into contact with the cured adhesive remains extremely pure, thus free of any contamination". See the specification at page 1, lines 1 to 15.

As further stated in the specification,

"in liquid immersion microscopy, for example, the numerical aperture (NA) and consequently the resolution of the microscope objective are increased by applying an immersion liquid between the steady lens and a steady object. The adhesive forces of the liquid keep the object immersed. When the object moves, however, breakdown of immersion may occur, either by pulling the liquid away from the lens or by pulling gas under the objective. The key issue in applying liquid immersion in a dynamic system such as a mastering machine therefore is to maintain a stable liquid film between the stationary lens and the moving substrate.

In critical applications such as for example deep-UV mastering of high density (Blu-ray Disc) optical discs using a high NA liquid immersion objective for writing of information in a photo-resist layer on a master disc, the proper development of the photo-resist is often impeded by a low concentration of impurities in the immersion liquid. This contamination (which might be very little) is due to leaching of impurities from adhesives used in constructing the objective and immersion accessory.

Conventionally, two-component epoxy-amine or epoxy-anhydride adhesive systems are used. It then often occurs that alkaline impurities from the adhesive, or, when the adhesive has been dosed, mixed and/or cured improperly, unreacted amines, leach into the water phase and next into the resist. (Even epoxy - anhydride systems may contain leachable tertiary amine accelerators). The aimed contrast between exposed and non-exposed areas will then, locally, be changed or even removed, showing up as point defects or as stains in the master disc. Such defects will thereafter also be transferred to the stampers and replicated discs made from such master discs.

The same problem of a partially or totally undeveloped resist has been observed with several positive tone resists, belonging for example to the novolac-diazoquinone type of resists. (Specification, page 1, lines 23 to 28 and page 2, lines 1 to 11).

The present invention provides an adhesive system which does not leach harmful impurities or components, and thus allows proper development of the exposed resist layer and subsequent stamper manufacturing". (Specification, page 2, lines 12 to 14).

EP-A-1005037 relates to a cationic UV curable composition, preferably consisting of an epoxy resin as the main component and a cationic polymerization type photo-initiator. Such systems are characterized by their capability of leaching ionic compounds which are likely to affect the resist behavior". (Specification at page 4, lines 5 to 8.)

Comparative example 1 of the present specification effectively illustrates the prior art in which discs were replicated from stampers made using a liquid immersion microscope system as outlined in Fig. 1c that was constructed by using a conventional epoxy-amine adhesive, namely Araldite 2011 (trademark of Vantico). The discs thus produced showed many point defects and stains as shown in Figs. 2 and 3. The defects were already present on the stamper used for replicating the disks (Fig. 4).

Thus in addition to the comparative example, applicant avers that systems that employ conventional epoxy-amine or epoxy-anhydride adhesives or novolac-diazoquinone systems or most significantly, cationic UV curable compositions, usually containing epoxy resins as the main component and a cationic polymerization type initiator, all leach impurities and therefore are not non-leaching as required by the instant claims. This is sufficient evidence that the instantly claimed adhesives possess unexpected properties that render them unobvious and unanticipated by the cited art.

It is well established that a claim is anticipated only if each and every element as set forth in the claim is found, either

expressly or inherently described, in a single prior art reference." *Manual of Patent Examining Procedure* § 2131 (8th ed., Rev. 4, Oct. 2005), citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 U.S.P.Q. 2d 1051, 1053 (Fed. Cir. 1987). The standard for rejection under 35 U.S.C. § 102 is identity.

Inherency arises when a single prior art reference fails to disclose the claimed invention per se, but the natural and invariable practice of the reference would necessarily and inherently meet all of the elements of the claimed invention. *Ethyl Molded Products v. Betts Package, Inc.*, 9 U.S.P.Q. 2d 1001, 1032-1033. Inherency exists only when the prior inherent event can be established as a certainty; that an event may result from a given set of circumstances is not sufficient to establish anticipation by inherency. See *Phillips Petroleum Co. v. U.S. Steel*, 6 U.S.P.Q.2d 1065 at 1076-1077, 673 F. Supp. 1278 (D. Del. 1987).

Probabilities are not sufficient for prior art to anticipate an invention inherently; a prior inherent event cannot be established based on speculation or where a doubt exists. *Id.*; *E.I. du Pont v. Phillips Petroleum*, 2 U.S.P.Q.2d 1545 at 1552, 849 F. 2d 1430 (Fed. Cir. 1988); *Schering Corp. v. Precision-Cosmel Co.*, 227 U.S.P.Q. 278 614 F. Supp. 1368 (D. Del. 1985) and many other cases.

The instant claims recite highly specific features, which are characteristics that were experimentally determined and are required of the adhesive systems of the instant claims. That the systems are non-leaching could not have been established as a certainty without any doubt based on what is shown in the applied references. Speculation based on mere structural or descriptive similarity is insufficient to establish inherent anticipation, in view of a legal standard that requires absence of any doubt.

It is applicant's discovery that certain curable, adhesive systems are non-leaching when cured. This is particularly important when such systems are used in the applications discussed above. For the foregoing reasons, the rejection of claims as anticipated or as obvious should be withdrawn.

In view of the above, it is respectfully submitted that the present application is in condition for allowance, and a Notice of Allowance is earnestly solicited.

Respectfully Submitted,

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